

## **HARDWARE SYSTEM FOR A CRIB**

by

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The present application is based on my United States Provisional Patent Application, Serial Number 60/164,079, titled Hardware System for a Crib.

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### **FIELD OF THE INVENTION**

The present application relates generally to the field of cribs and more particularly to a hardware system for a crib which can be easily and safely assembled without a need for tools and which can be easily operated with just one hand.

### **BACKGROUND OF THE INVENTION**

Despite the various developments in the field of cribs there remains a need for a hardware system for a crib which



is strong, safe, easy to assemble and relatively inexpensive.

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#### OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the present invention to provide a hardware system for a crib which can be assembled by a user without the need for tools of any kind.

10 Another object of the present invention is to provide a hardware system for a crib which can be easily operated with just one hand.

Another object of the present invention is to provide a hardware system for a crib in which the side rail cannot fall out.

15 Another object of the present invention is to provide a hardware system for a crib which meets all applicable safety standards.

20 Another object of the present invention is to provide a hardware system for a crib which provides for safe operation.

Another object of the present invention is to provide a hardware system for a crib which provides reliable long term operation.



Yet another object of the present invention is to provide a hardware system for a crib which comprises a relatively small number of component parts each of which can be manufactured economically resulting in a relatively low overall cost.

The foregoing and other objects and advantages of the invention will appear more clearly hereinafter.

In accordance with the present invention there is provided a hardware system for a crib which includes a pair of upper rail guides which are mounted on opposite ends of the upper rail of the side rail assembly of the crib. Each of the upper rail guides has a T-shaped steel pin which rides in a T-shaped slot which is formed in the upper guides which are mounted on each of the headboards of the crib.

A key feature of the present invention is the lower rail guide. A pair of lower guides are mounted on lower portions of the headboards. The lower rail guides each have a T-shaped steel pin. When the side rail is in the upper locked position, the steel pin enters a locking slot formed in the upper portion of the lower guides. When it is desired to lower the side rail of the crib, the side rail must first be raised to allow the steel pin to leave the locking slot and the side rail must then be pushed inwardly relative to



the crib to overcome an integrally formed cantilever spring which normally blocks access to a guide groove which is formed in the lower guide. When the cantilever spring is pushed inwardly, the steel pin gains access to the guide slot and the steel pin can then slide downwardly thereby moving the side rail down. The cantilever spring and the lower guide are preferably integrally formed of plastic. When the side rail is raised, the steel pin pushes past the cantilever spring and then rides down a ramp to enter the locking slot.

The side rail can be easily operated with just one hand by raising the side rail with one hand and pushing the side rail inwardly with the knee.

The side rail is assembled to the headboard by inserting the steel pin into a T-shaped entrance slot which is formed in the lower guide thereby allowing the steel pin to enter the guide slot.

It should be understood that this T-shaped entrance slot can be positioned on the side of the guide slot as shown or on the bottom of the guide slot or on the top of the guide slot.

In an alternate embodiment of the invention, the upper rail guides are replaced by upper rail guides which have a



pair of inwardly projecting flanges which engage the T-shaped upper guide.

#### DESCRIPTION OF THE DRAWINGS

5 Other important objects and advantages of the invention will be apparent from the following drawings in which:

Fig. 1 is a side elevation view of a crib showing the installation of the hardware system for a crib according to the present invention;

10 Fig. 2 is a fragmentary side elevation view drawn to an enlarged scale showing the attachment of the lower rail to the lower guide which is mounted on the left headboard;

Fig. 3 is a fragmentary elevation view taken along the line 3-3 of Fig. 2;

15 Fig. 4 is a fragmentary side elevation view drawn to an enlarged scale showing the attachment of the lower rail to the lower guide which is mounted on the right headboard;

Fig. 5 is a fragmentary perspective view showing the lower guide removed from the headboard and showing the steel  
20 pin of the lower rail guide positioned in the locking slot, with the lower rail guide in the upper and locked position and showing the cantilever plastic spring covering the guide slot;





Fig. 6 is a perspective view of the upper guide;

Fig. 7 is a front elevation view of the upper guide;

Fig. 8 is a side elevation view of the upper guide;

Fig. 9 is a rear elevation view of the upper guide;

Fig. 10 is a elevation view of the headboard with the headboard shown removed from the crib with the headboard shown as shipped from the factory with the upper rail guide and the lower rail guide in place;

Fig. 11 is a perspective view of the side rail assembly;

Fig. 12 is a perspective view of the lower guide;

Fig. 13 is a perspective view of the lower rail guide;

Fig. 14 is a rear elevation view of the lower guide;

Fig. 14A is a side view taken along the line 14A-14A of Fig. 14;

Fig. 14B is a fragmentary cross-sectional view taken along the line 14B-14B of Fig. 14;

Fig. 14C is an elevation view of a release pin for use on the lower guide;

Fig. 15 is a front elevation view of the lower guide;

Fig. 15A is a fragmentary cross-sectional view taken along the line 15A-15A of Fig. 15;



Fig. 15B is a fragmentary view similar to Fig. 15 showing the deflected position of the cantilever spring in broken lines;

Fig. 15C is a cross-sectional view taken along the line  
5 15C-15C of Fig. 15;

Fig. 16 is a side elevation view of the lower guide;

Fig. 17 is an end elevation view of the lower guide;

Fig. 18 is a bottom plan view of the lower guide;

Fig. 19 is a top plan view of the lower guide;

10 Fig. 20 is a cross-sectional view taken along the line  
20-20 of Fig. 19;

Fig. 21 is a plan view taken along the line 21-21 of  
Fig. 20;

Fig. 22 is a perspective view of a rubber bumper;

15 Fig. 23 is a perspective view of an alternative upper  
guide;

Fig. 24 is a perspective view of an alternative upper  
rail guide;

Fig. 25 is an elevation view of an alternative lower  
20 guide which incorporates a metal spring;

Fig. 26 is a fragmentary perspective view of the  
alternative lower guide of Fig. 25 showing the details of



construction of the metal spring and showing the side rail assembly in the upper locked position;

Fig. 27 is an elevation view of an alternative lower guide which incorporates an alternative metal spring, and

5 Fig. 28 is a fragmentary perspective view of the alternative lower guide of Fig. 27 showing the details of construction of the alternative metal spring and showing the side rail assembly in the upper locked position.

#### DETAILED DESCRIPTION OF THE INVENTION

10 With reference to the drawings, in which like reference numbers designate like or corresponding parts throughout, there is shown in Fig. 1 a hardware system for a crib, generally designated by reference number 10, made in  
15 accordance with the present invention, which includes: a pair of upper rail guides 12 which are mounted on opposite ends of the upper rail 14 of the side rail assembly 16 of a crib 18. Each of the upper rail guides 12 has a T-shaped steel pin 20 which rides in a T-shaped slot 22 which is  
20 formed in the upper guides 24 which are mounted on each of the headboards 26 of the crib 18. The upper guides 24 are best shown in Figs. 6, 7, 8 and 9.



A key feature of the present invention is the lower rail guide 28 and the lower guide 30. The lower rail guides 28 are best shown in Figs. 2, 14 and 13.

The upper and lower rail guides 12 and 28 are  
5 identical.

A pair of lower guides 30 are mounted on lower portions 32 of the headboards 26. The lower rail guides 28 each have a T-shaped steel pin 20. When in the upper locked position, the steel pin 20 enters a locking slot 34 formed in the  
10 lower guide 30 as is best shown in Fig. 5. The locking slot 34 is formed by a first aperture 38 which communicates with a second aperture 40 as is shown in Fig. 14.

When it is desired to lower the side rail 16 of the crib 18, the side rail 16 must first be raised to allow the  
15 steel pin 20 to leave the locking slot 34 and the side rail 16 must then be pushed inwardly relative to the crib 18 to overcome an integrally formed cantilever spring 42 which normally blocks access to a guide slot 44 which is formed in the lower guide 30. When the cantilever spring 42 is pushed  
20 inwardly the steel pin 20 gains access to the guide slot 44 and the steel pin 20 can then slide downwardly thereby moving the side rail 16 down. The cantilever spring 42 is



preferably integrally molded as part of the lower guide 30 which is made of plastic.

When the side rail 16 is raised, the steel pin 20 pushes past the cantilever spring 42 and then rides down a ramp 46 to enter the locking slot 34.

The details of construction of the lower guide 30 are best shown in Fig. 14, 14A, 14B, 15, 15A, 15B and 15C. The integrally molded cantilever spring 42 projects upwardly from the portion 48 of the lower guide 30. The upper end 50 of the cantilever spring 42 has a step portion 52 which moves into a recess portion 54 when the pin 20 moves upwardly, in the direction of the arrow 56 in Fig. 15B, thereby deflecting the cantilever spring 42 in the direction shown by the arrow 58 in Fig. 15B. The deflected position of the cantilever spring 42 is shown in broken lines 60 in Fig. 15B. The recess portion 54 is defined in part by an integrally molded safety wall 62. The safety wall 62 prevents excessive deflection of the cantilever spring 42 in the direction shown by the arrow 64 in Fig. 15A and thereby prevents overstressing the cantilever spring 42. The safety wall 62 prevents the steel pin 20 from leaving the guide 30.

As is shown in Fig. 15B when the side rail 16 and the steel pin 20 are lifted, the steel pin 20 enters the



aperture 38 and rides down the ramp 46 to enter the aperture 40. The ramp 46 has a dual function. When the side rail 16 is raised, the ramp 46 allows the steel pin 20 to easily ride down into the aperture 40. When the side rail 16 is to be lowered, the ramp 46 allows the steel pin 20 to ride up the ramp 46 to a position in contact with the cantilever spring 42 whereby pressure in the direction shown by the arrow 56, in Fig. 15B causes the pin 20 to deflect the cantilever spring 42 thereby allowing the pin 20 to enter the slot 44.

The apertures 38, 40 form the general configuration of a capital letter T. The portion 66 of the lower guide 30 adjacent to the aperture 38 forces a user to raise the side rail 16 and then lower the side rail 16 slightly thereby allowing the pin 20 to enter the aperture 38. This relatively complex motion required by the present invention of raising the side rail 16 and then slightly lowering the side rail provides an additional measure of safety while allowing the operation of the crib 18 to be performed with one hand.

The side rail 16 can be easily operated with just one hand by raising the side rail 16 with one hand and pushing the bottom 67 of the side rail 16 inwardly with the knee.



The lower guide 30 includes a pair of projecting pins 68, 70 which cooperate with complementary holes in the headboard 26 to prevent flexing of the lower guide 30 and thereby maintain the free running of the pin 20 in the slot 44.

The side rail 16 is assembled to the headboard 26 by inserting the steel pin 20 into a T-shaped entrance slot 72 which is formed in the lower guide 72 thereby allowing the steel pin 20 to enter the guide slot 44.

It should be understood that this T-shaped entrance slot 72 can be positioned on the side 74 of the guide slot 44 as shown or on the bottom 76 of the guide slot 44 or on the top 78 of the guide slot 44.

The T-shaped entrance slot 72 has an integrally formed locking cantilever spring 80. The locking cantilever spring 80 has an end 82 which projects into the slot 72. When the side rail 16 is assembled to the headboard 26 the steel pin 20 is pushed past the locking cantilever spring 80 thereby entering the guide slot 44.

When it is desired to remove the side rail 16 a release pin 84 is pushed into a hole 86 formed on the surface 88. As the pin 84 is pushed into the hole 86 the end 90 of the pin 84 bears against the cantilever spring 80 bending the



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cantilever spring 80 in an inward direction and moving the  
tip 92 of the cantilever spring 80 inwardly sufficiently to  
allow the tip 92 to clear the slot 72 thereby allowing the  
steel pin 20 to move out in the direction shown by the arrow  
5 94 in Fig. 14. The lower guide 30 includes a stop 94 which  
supports a rubber bumper 96.

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In an alternate embodiment of the invention the upper  
guides 24 are replaced by alternative upper guides 102 one  
of which is shown in Fig. 23 and the upper rail guides 12  
10 are replaced by the upper rail guides 104 as is shown in  
Fig. 24. The lower guides 30 and the lower rail guides 28  
are as described above. The upper rail guide 104 has a pair  
of inwardly projecting flanges 106, 108 which engage the T-  
shaped upper guide 102.

15 In the primary embodiment of the invention 10 the lower  
guide 30 and the cantilever spring 42 are made of plastic.

Figs. 25 and 26 show an alternative embodiment of the  
invention 200 which incorporates a metal cantilever spring  
202. The spring 202 is mounted in a slot 204 which is  
20 formed in the lower guide 206. The first end 208 of the  
spring 202 is bent to form a tab 210 which helps retain the  
spring 202 in the slot 204. The spring 202 operates in the



manner previously described in connection with the spring 42 to retain the pin 20.

Figs. 27 and 28 show another alternative embodiment of the invention 300 which incorporates a metal leaf spring 302. The first and second ends 304, 306 of the spring 302 are mounted in slots 308, 310 which are formed in supports 312, 314 which are formed on the lower guide 316. The center portion 318 of the spring 302 operates in the manner previously described in connection with the spring 42 to retain the pin 20.

The springs 202, 302 are behind and not in the planes of walls 212, 320 of the guides 206, 316, respectively.

The foregoing specific embodiments of the present invention as set forth in the specification herein are for illustrative purposes only. Various deviations and modifications may be made within the spirit and scope of this invention without departing from the main theme thereof.